

# A new peculiar minute bug (Hemiptera, Heteroptera, Cimicomorpha, Microphysidae) from the Eocene Baltic amber

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**Abstract:** A new fossil representative of the bug cimicomorphan family Microphysidae from Baltic amber (Late Eocene) is described and figured: *Tytthophysa sylwiae* gen.n., sp.n.. A new key for all fossil microphysids hitherto described is presented.

**Key words:** Baltic amber, Heteroptera, Microphysidae, *Tytthophysa*, minute bug, new genus, new species.

**Santrauka:** Nauja fosilinė blakė *Tytthophysa sylwiae* n.gen., n.sp., priklausanti šeimai Microphysidae, Cimicomorpha yra aprašoma ir iliustruojama iš Baltijos gintaro (vėlyvasis eocenas). Sudarytas naujas apibūdinimo raktas visoms iki šiol žinomoms fosilinėms mikrofisidinių blakių rūšims.

**Raktiniai žodžiai:** Baltijos gintaras, Heteroptera, Microphysidae, *Tytthophysa*, nauja gentis, nauja rūšis.

## Introduction

This article is a continuation of a series of papers on fossil microphysid bugs from various fossil resins containing insect inclusions, in particular from Baltic (Prussian Formation), Ukrainian (Rovno), and Saxonian (Bitterfeld) amber, mainly found in different European museums and private collections of Austria, Germany, Poland, Russia, and Baltic countries. Microphysidae (little pirate bugs or minute bugs) is a small family (about 30 species and 4 recognized genera) of very tiny insects (not more than 3 mm) the majority of which are mainly distributed in Palearctic and also a few in Nearctic regions. They are quite active predators, sucking on small arthropods. Microphysidae are habitually strikingly resembling members of the family Anthocoridae (especially of the tribe Oriini, showing the smallest size), and altogether they are very tiny bugs of 1.2 to 3 mm. However, they belong to completely separate phylogenetic lineages: microphysid and cimicoid lineages (SCHUH & ŠTYS 1991).

In general, 10 species have so far been described from Baltic and Ukrainian (Rovno) amber (KULICKA et al. 1996; PUTSHKOV & POPOV 2003; POPOV 2004, 2006; POPOV et al. 2008). However, one of them, *Loricula* (s.str.) *ablusa* POPOV originally placed in Microphysidae (POPOV 2006), must now be transferred to the Anthocoridae (most probably to the tribe Oriini). Another cimicoid bug from Baltic amber, recorded as *Loricula* (*Myrmedobia*) *kerneggerorum* POPOV, in prep. (POPOV

2006) must also be excluded from the Microphysidae and be transferred to the Anthocoridae, and placed in the tribe Cardistethini.

## Systematic part

Order Hemiptera

Suborder Heteroptera

Infraorder Cimicomorpha LESTON, PENDERGAST & SOUTHWOOD, 1954

Superfamily Miroidea HAHN, 1833

Family Microphysidae DOHRN, 1859

Subfamily Microphysinae DOHRN, 1859

Type genus: *Loricula* CURTIS, 1833.

*Tytthophysa* nov.gen.

Type species: *Tytthophysa sylwiae* nov.sp.

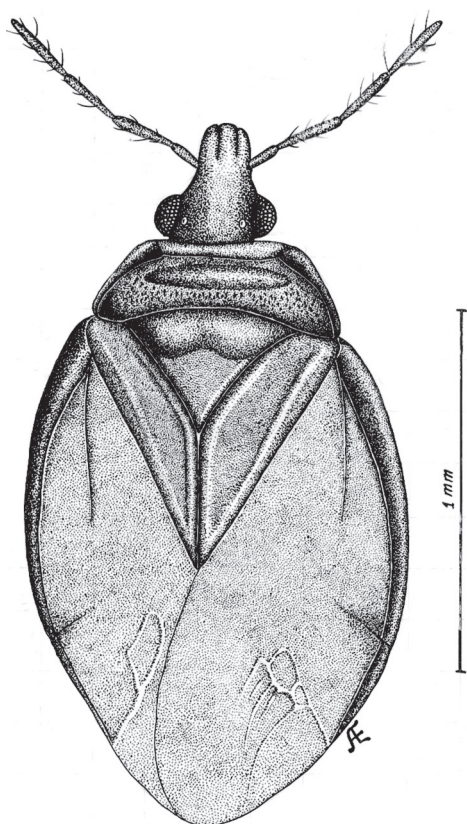
**Description:** Body round-oval, less than twice as long as wide. Head with ocelli. Preocular part moderately elongate. Pronotal margins flattened and pronotal collar placed between anterior pronotal angles. Thin rostrum reaching anterior coxae and segment II almost reaching base of head. Hemelytra with a wide external margin of exocorium reaching the cuneal apex while corium, cuneus, and membrane are not distinctly separated. Cuneal fracture distinct. Clavus with two thickened veins. Membrane with a distinct basal cell from which several veins are branching. Female macropterous, ocelli present.



**Fig. 1:** *Tytthophysa sylwiae* nov.sp.; holotype, ♀, dorsal view (1).

**Fig. 2:** *Tytthophysa sylwiae* nov.sp., ventral view (3).

**Fig. 3:** *Tytthophysa sylwiae* nov.sp.; holotype, dorsal view (2).



**Etymology:** The genus name *Tytthophysa* is a combination of “tytthos” (Greek: small) and the suffix of the microphysid family. Gender is feminine.

#### *Tytthophysa sylwiae* nov.sp. (Figs 1-3)

**Material examined:** Holotype, macropterous ♀, inv. nr. BB MP HE 9, is housed in the collection of E. HEISS, Tiroler Landesmuseum, Innsbruck, Austria. Small, light-yellowish piece of amber (10 x 6 mm), rectangular shape. The specimen is dorsally and ventrally clearly visible; antennae are complete, distal parts of

middle and hind tibiae and tarsi are broken; legs are bent ventrally.

**Description:** Body length from head to apices of hemelytra 1.8 mm. Oval, 1.8 x as long as wide. General coloration uniformly yellow-brownish, head brownish. Dorsal surface smooth, not punctate, head and especially pronotal callosity glabrous, pronotum and hemelytra (corium and clavus) covered with tiny, hardly visible hairs, membraneous part glabrous.

Head moderately elongated, length and width are of equal size; length and width of preocular part are almost of equal length; head 1.36 x as long as pronotum; frons wide, almost 3 times as wide as diameter of eye; ocelli well developed, rather small; rostrum more or less thin, reaching posterior margin of anterior coxae; antennae slender with pilose segments, the last segment with some long hairs, segment II-IV almost of equal length, II about 0.62x as long as diatone; proportions of antennal segments I-IV: 7-15-14-16. Pronotum distinctly transverse, 2.5x as wide as long, its posterior margin slightly emarginated, 2.13x as wide as anterior one, lateral margins converging anteriorly; anterior part of pronotum with one transversal polished callosity; narrow collar located between anterior rounded angles of pronotum; flattened lateral margins well developed and gradually narrowing backward along pronotal disc. Mesoscutum glabrous and 0.82x as long as scutellum, the latter is mat. Lateral margins of hemelytra rather convex; exocorium widest at base, narrowing along its length reaching to the cuneal apex; apex of cuneus obscure; proportion of length of hemelytron, corium and cuneus: 1.3-0.8-1.2; length of cuneal part 0.23x as long as hemelytron and 0.38x as long as corium; membrane is not clearly differentiated and membraneous part hardly visible, membranal venation as in fig. 1. Metaxypus short and its apex widely rounded. Tibiae and femora of

all legs bare; their tarsi are short, about 0.25x as long as tibiae.

**Measurements (in mm):** Body length (including hemelytra) 1.8, width 1.0; head: length 0.34, width (diatone) 0.34; preocular part 0.18, ocular + postocular parts 0.16, width of eyes 0.07; width of frons 0.2; antennal segments I-IV: 0.1:0.21:0.2:0.23; pronotum: length 0.25, width 0.3 (ant.) and 0.64 (post.); length of open part of mesoscutum 0.15, of scutellum 0.18; length of hemelytron, corium and cuneus: 1.3, 0.8 and 0.3; fore-leg: coxa 0.2, trochanter 0.11, femur 0.3, tibia 0.3, middle leg: trochanter 0.1, femur 0.32; hind leg: trochanter 0.13, femur 0.46.

**Etymology:** Named after Mrs. Sylwia KOSTRZYŃSKA, the wife of one of my friends – the well-known Polish collector of amber inclusions Jacek SERAFIN.

**Comparison:** The new genus is quite different from the genus *Loricula* (s.l.). It has a round oval body (only 1.8 times as long as wide) and the structure of hemelytra with a wide external margin of exocorium reaching even the cuneal apex while corium and membrane are not distinctly divided (the membranous part is only recognizable by the absence of any hairs). The pronotal collar placed between anterior rounded pronotal angles due to the well developed flattened lateral margins of the pronotum is a typical feature for the subgenus *Myrmedobia* (s.m.) of *Loricula*. On the other hand, thin rostrum reaching anterior coxae and second rostral segment almost reaching base of head are characteristic for the subgenus *Myrmericula*. It should also be noted that the female of *Tythophysa sylwiae* sp.n. is a true macropterous form with well developed ocelli, which are unknown and are not typical of the extant Microphysidae. These truly well developed ocelli also characterize fossil macropterous females of *Loricula* (M.) *ocellata* POP. and *Loricula* (M.) *samlandi* POP. from Baltic amber (POPOV 2006).

## Key to fossil species of the Micropysidae

- 1(2) Body oval, rounded laterally; hemelytra are not clearly divided into corial and membranous parts; cuneus indistinct, costal margin (exocorium) rather broad and reaches cuneal apex. Length 1.8 mm (genus *Tythophysa*) ... *T. sylwiae* nov.sp.
- 2(3) Body oblong, usually almost laterally parallel; hemelytra distinctly divided into corium, cuneus and membrane, costal margin (exocorium) narrow and usually reaching only costal fracture (genus *Loricula*) ..... 3
- 3(4) Head short, at most 0.67x as long as length of pronotum; rostrum very thick and short, not

reaching anterior coxae, distinctly shorter than head and pronotum taken together (subgenus *Myrmedobia*) ..... *L. (M.) pericarti* POPOV, 2004

- 4(3) Head distinctly longer; at least 0.77x as long as pronotum; rostrum considerably thinner and always reaching at least anterior coxae ... 5
- 5(6) Head strongly elongate, especially preocular part which is at least 1.3x as long as ocular and postocular part; females with well developed ocelli; rostrum reaches middle of mesosternum; subbrachypterous and submacropterous forms (subgenus *Eocenophysa*) ..... *L. (E.) damzeni* POPOV, 2004
- 6(11) Head moderately long, slightly shorter than pronotum; rostrum reaches at least middle of mesosternum; second rostral segment reaches base of head (subgenus *Loricula*) ..... 7
- 7(8) Pronotum slightly converging anteriorly, posterior margin about 1.5x as wide as anterior one and more emarginated. Length 1.6 mm .. *L. (s.str.) ceranowiczae* POPOV, 2004
- 8(7) Pronotum distinctly converging anteriorly, posterior margin about 2.1-2.2x as wide as anterior one; antennae without pilosity; external margin of hemelytral exocorium reaches cuneal fracture ..... 9
- 9(10) Head smooth, shorter (1.5x as wide as long); second rostral segment slightly passing base of head; posterior margin of pronotum straight, transverse callosity weakly elevated and bilobed in the form of obscure low swellings. Length 1.7 mm ..... *L. (s.str.) finitima* POPOV, 2006
- 10(9) Head mat, longer (1.3 as wide as long); second rostral segment reaches only base of head; posterior margin of pronotum distinctly emarginated, transverse callosity clearly elevated and not divided; mesonotum with two glabrous spots. Length 1.5 mm ..... *L. (s.str.) polonica* POPOV & HERCZEK, 2008
- 11(6) Head 1.2-1.4x as long as the pronotum; rostrum rather thin, reaching only posterior border of anterior coxae; second rostral segment almost reaching base of head (subgenus *Myrmericola*) ..... 12
- 12(13) Dorsal surface of body bare, lateral sides quite strongly widened backward (posterior margin c. 2.5 times broader than anterior one); surface of pronotum almost glabrous, transversal



pronotal groove not expressed, anterior part of pronotum with a transverse narrow polished stripe; antennal segments 2-4 of almost equal length; external margin of hemelytral exocorium of same width along its length, reaching cuneal fracture; cuneus very distinct. Length about 2 mm . . . . *L. (M.) heissi* POPOV, 2006

- 13(12) Dorsal surface of body, except of head, covered by pale, very short, adpressed hairs, lateral sides parallel; pronotum with a transverse impression and a callosity; 2<sup>nd</sup> antennal segment usually longer than third and equal length as fourth; external margin of exocorium weakly developed and not expanding posteriorly . . . . . 14
- 14(15) Pronotum transverse, about 2.5x as wide as long, lateral margins feebly explanate, callosity and transverse impression well developed, pronotum strongly converging anteriorly; posterior margin almost 2.5x as wide as anterior one; cuneus distinctly shorter than corium and about 1/3 as long as the latter; legs without pilosity. Length 1.75 mm (Rovno, Ukrainian amber) . . . . . *L. (M.) perkovskyi* PUTSHKOV & POPOV, 2003
- 15(14) Pronotum less transverse about twice as wide as long, lateral margins not visible, pronotum moderately converging anteriorly, posterior margin not more than twice as wide as anterior one; females macropterous with well developed ocelli; pronotal callosity and transverse impression rather obscure; cuneus distinctly longer than 1/3 the length of the corium; legs pilose . . . . . 16
- 16(17) Preocular part of head of equal length as ocular and postocular part; lateral margins of pronotum distinctly converging anteriorly, posterior margin almost twice as wide as anterior one; hind tibiae with long erect hairs which are longer than the diameter of the tibiae. Length 1.8 mm . . . . . *L. (M.) ocellata* POPOV, 2006
- 17(16) Preocular part of head longer than ocular and postocular part; lateral margins of pronotum only slightly converging anteriorly, posterior margin narrower and about 1.5x as wide as anterior one; hind tibiae with short hairs which are shorter than the diameter of the tibiae. Length 1.9 mm . . . . . *L. (M.) samlandi* POPOV, 2006

## Zusammenfassung

Aus dem Baltischen Bernstein (Spätes Eozän) wird ein neues Taxon der cimicomorphen Heteropterenfamilie Microphysidae beschrieben und abgebildet: *Tythophysa sylwiae* gen.n., sp.n. Für die bisher bekannten fossilen Vertreter der Microphysidae wird ein Bestimmungsschlüssel vorgelegt.

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## References

- KULICKA R., A. HERCZEK & Y.A. POPOV (1996): Heteroptera in Baltic amber. — *Prace Muz. Ziemi* **47**: 19-23.
- POPOV Y.A. (2004): New microphysids (Heteroptera: Cimicomorpha, Microphysidae) from Baltic amber and taxonomy of this family. — *Prace Muz. Ziemi* **47**: 97-107.
- POPOV Y.A. (2006): New microphysids (Heteroptera, Cimicomorpha, Microphysidae) from Baltic Eocene amber from the collection of Ernst HEISS. — *Denisia* **19**: 571-579.
- POPOV Y.A., A. HERCZEK & I. KANJA (2008): One more microphysid (Heteroptera: Cimicomorpha, Microphysidae) from the Eocene Baltic amber. — *Genus* **19** (4): 611-617.
- SCHUH R.T. & P. ŠTYS (1991): Phylogenetic analysis of Cimicomorphan family relationship (Heteroptera). — *J. New York Entomol. Soc.* **99**: 298-350.

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